TSNA Patents Rev 12/07/00

Inventor	Patent Number	Title	Remarks
Formation in Leaf			
Williams	US 6,135,121	Tobacco products having reduced nitrosamine content. (AP 1997)	Star Scientific
Williams (1)*	WO 200015056	Prevention of nitrosamine formation in a tobacco plant involves subjecting the tobacco plant into a controlled environment for a certain period of time. (AP 1999)	Star Scientific
O'Donnell (6)	WO 9805226	Reducing amount of or preventing formation of nitrosamines in harvested tobacco plant - by subjecting it to microwave radiation while uncured and in state in which amount of nitrosamines can be reduced ot their formation prevented. (AP 1999)	Star Scientific
Williams (4)	WO 9858555	Reducing amt of or preventing formation of nitrosamine in harvested tobacco plant - by removing stems, pressing leaves to remove moisture or steam treating leaves and subjecting to microwave radiation after onset of yellowing of leaves, without stacking or piling of leaves. (AP 1998)	Star Scientific
Gajic (14)	DE 3904169	Reducing amount of carcinogenic nitrosamine cpds. in tobacco - by treating seed, soil, plant or opt. harvested leaves with bio-regulator based on caryophillacea family. (AP 1989)	
Additive to Cured Tob			
Shen (2)	CN 1228945	Additive for reducing content of nitrosamine in cigarette smoke and cigarette containing the additive. (AP 1999)	Alginate, zeolite on shreds, red. NA** in smoke 17-65%.
Shen (3)	CN 1209970	Cigarette with low or moderate nitrosamines content in smoke - is prepared by mixing tobacco shreds with zeolite carrying oxides of metal *e.g.* magnesium. (AP 1998)	NA in smoke red. *ca.* 50%
Nakajima (18)	JP 62014774	Agent suppressing prodn of harmful substances in tobacco smoking - comprises methanol, ascorbic acid, glythymine, comfrey, perreloxy-annaoxin, stearic acid, lecithin, benzoic acid *etc.* (AP 1985)	BP and NA, nicotine reduced?
Nakajima (19)	JP 62014772	Cigarettes with moderated cancer-inducing effect - obtd. from menthol, ascorbic and benzoic acids, glythymine, comfrey powder, vanillin, stearic acid B, vertol, clove aniline, lecithin *etc.* (AP 1985)	BP and NA, nicotine reduced?
Pintaske (20)	BE 885758	Tobacco additive for reducing amt of harmful substances	"...formation of N-ntrrosamines

BP = BaP

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		in smoke - comprising urea and/or an organic acid amide. (AP 1979?)	is impeded."
Hoffman-LaRoche (22)	DE 2506100	Tobacco contg. ascorbic acid or erythorbic acid and their salts - to reduce nitrogen dioxide and nitrosamine content of smoke. (AP 1975?)	Pyrosynthesis
Kopsch (26)	US 5,944,026	Tobacco products or materials resembling tobacco products containing natural substances having an antioxidative effect and processes for the preparation thereof. (AP 1994)	Pyrosynthesis
Hersh (30)	US 5,829,449	Smoking products containing antioxidants - comp. Includes L-glutathione and a source of selenium such as seleno-methionine. (AP 1997)	Pyrosynthesis?
Meier (31)	US 5,727,573	Smoker's article - zeolite, molecular sieve. (AP 1996)	TSNA red. In sidestream smoke
Nakajima (35)	US 5,000,198	Agent for removing noxious tobacco components - menthol mixtures for treatment of tobacco leaves. (AP 1989)	
Mergens (36)	US 3,958,580	Treatment of tobacco with ascorbic acid. (AP 1975)	Nitrogen dioxide, VNA reduction.
Newton (37)	US 3,957,060	Tobacco treatment - urea or biuret treated. (AP 1971)	Pyrosynthesis?
<u>Prevent transfer in Smoker</u>			
Keeney (11)	US 5,016,655	Tobacco-smoking articles - comprising tobacco sprayed with an alcohol to prevent selective localisation of nitrosamine(s) and metabolites. (AP 1989)	CA Blockers
Keeney (12)	US 4,967,772	Tobacco smoking article - comprises smoking tobacco in container, with encapsulated cyclohexanol to inhibit selective localisation of nitrosamine(s). (AP 1987)	CA Blockers
Keeney (15)	US 4,996,169	Cigarettes having preselected added alcohol(s) - to prevent carcinogens from the smoke being absorbed by the epithelial lining of the lungs. (AP 1988)	CA Blockers
Egilmezrey (16)	ZA 8801246	Safety cigarette mfr process - involves spraying tobacco with alcohol to block effect of harmful substances. (AP 1988)	CA Blockers
Marlowe (17)	WO 8901301	Tobacco smoking article - incorporates alcohol cpd. forming vapours inhibiting selective localisation of carcinogenic nitrosamine(s) in tissues. (AP 1987)	CA Blockers
<u>Extract/Reconst. Tobacco</u>			
Northway (5)	US 5,810,020	Process for removing barium cation and nitrate and nitrate anions from tobacco materials - by mixing aqueous	Extraction of NAs? Denitrosation of NAs with a

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		immiscible organic solvent containing crown ether with aqueous solution containing soluble components from tobacco, agitating and separating organic and aqueous phases. (AP 1993)	"...trapping sink compris[ing] a select transition metal complex which is readily nitrosated to form a nitrosyl complex..." Protein removal linked to reduced pyrosynthesis?
Arnarp (9)	WO 9407382	Treating green tobacco to obtain tobacco prod. having low mutagenicity - by conversion of tobacco plant material to pulp and division of pulp into solid coarse fraction and liq. fraction followed by further processing. (AP 1992)	
Prevent Contam with NA			
Kwiatkowski (7)	WO 9701527	4-N-alkyl-dinitro-alkyl-aniline prodn. esp. herbicidal butralin' - from alkylphenol by methylation to alkyl-anisole, nitration, and reaction with amine. (AP 1996)	Contaminated herbicide may contain nitrosamines.
Absorbent			
Ibuki Tadashi Kagaku (13)	JP 02211163	New deodorant for cigarette *etc.* - is prepd. by mixing inorganic phosphate with base agent of silicate and moulding. (AP 1989)	Deodorant for cigarette smoke, ashtrays, etc.
Filtration			
Safaev (8)	RU 2045821	Cigarette filter mfr. for tobacco industry for increased effectiveness using cellulose and/or acetate fibre impregnated with alcoholic salicylic acid, for reducing nicotine amt. in smoke and benzopyrene removal. (AP 1992)	
Sinelnikov (10)	EP 493026	Cigarette filter comprising base impregnated with adsorbing agent - removes many carcinogenic and toxic substances from tobacco smoke. (AP 1991)	
Teufel (23)	US 6,145,511	Filter cigarette - antimutagenic activity on cigarette smoke using additive to fibrous filter. (AP 1996)	Variety of additives to filter reduce Ames reactivity of tar Smoke "...essentially free of said nitrosamines and secondary amines"
Epstein (21)	US 4,156,431	Tobacco smoke filter - with means for removing nitrosamine(s) pref. polystyrene and means for removing amine(s) pref. silicic acid. (AP 1977)	
Cerami (24)	US 6,119,701	Methods, agents and devices for removing nucleophilic toxins from tobacco and tobacco smoke. (AP 1998)	
Lesser (25)	US 5,975,086	Cigarette filter containing dry water and microcapsules (AP 1998)	
Stavridis (27)	US 5,909,736	Removal of noxious oxidants and carcinogenic volatile	Hemoglobin added to filter

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		nitroso compounds from cigarette smoke using biological substances. (AP 1996)	
Lesser (28)	US 5,860,428	Cigarette filter containing a humectant - pref. sodium pyro-glutamate. (AP 1995)	
Lesser (29)	US 5,839,447	Cigarette filter containing microcapsules and sodium pyro-glutamate. (AP 1996)	
Safaev (33)	US 5,409,021	Cigarette filter - acetate, cellulose or acetatecellulose part joined by wrapping to adsorbent lignin. (AP 1993)	
Irimi (34)	US 5,060,672	Highly efficient tobacco smoke filter - synergistic scavengers for formaldehyde, unsaturated diols, cigarette smoke, anti-carcinogenic agents. (AP 1989)	
Blocker (32)	US 5,575,302	Filter for removing nitrogen oxides from tobacco smoke - polyphenylene sulfide. (AP 1994)	No claim of NA removal.

N.B. *abstract number in Goldsmith-to-Hempfling memo of 30 Nov. 2000.

** NA = nitrosamine

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